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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
| 10/777,084      | 02/13/2004  | Yoshinori Miyaki     | 501.37215VC3        | 4121             |

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EXAMINER

WILSON, CHRISTIAN D

ART UNIT

PAPER NUMBER

2824

DATE MAILED: 12/10/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/777,084

Applicant(s)

MIYAKI ET AL.

Examiner

Christian Wilson

Art Unit

2824

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-6 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-6 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 13 February 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |   |  |
|---|--|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)            |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>02132004</u> . | 6) <input checked="" type="checkbox"/> Other: <u>search history</u> .                  |

## DETAILED ACTION

### *Claim Rejections - 35 USC § 103*

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1 – 3, 5, and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shibata in view of Oga *et al.*

Regarding claim 1, Shibata (US 5,757,082) teaches a semiconductor device [Figure 1] comprising a lead frame 1 with a die pad 2, supporting leads 3 formed with the die pad, a plurality of leads 5 disposed around the die pad, a semiconductor chip C mounted on the die pad with bonding pads 6 formed on the main surface of the chip in a quadrilateral shape and along the four sides of the chip, a plurality of bonding wires 7 connecting the pads and leads, a resin body 9 sealing the chip, die pad, supporting leads, leads, and wires, where the pitch between the first bonding pads at the corners is wider than the pitch between second bonding pads at the center of the sides [column 4, lines 35-40]. Shibata teaches a die pad with a larger size than the semiconductor chip. Oga *et al.* (US 5,708, 295) teaches a die pad which is smaller than the semiconductor chip [column 10, lines 1-10]. It would have been obvious to one of ordinary skill in the art to use the smaller die pad of Oga *et al.* in the device of Shibata since the smaller die pad provides effective prevention of a package crack [column 10, lines 30-35].

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Regarding claim 2, Shibata teaches a die bonded to the die pad, but does not discuss the adhesive. Oga *et al.* teaches an adhesive [column 16, lines 45-50]. It would have been obvious to one of ordinary skill in the art to use the adhesive of Oga *et al.* in the device of Shibata since this is a well known means for bonding a die to a die pad.

Regarding claim 3, Shibata teaches a square die pad. Oga *et al.* teaches a circular die pad [Figure 6]. It would have been obvious to one of ordinary skill in the art to use the circular die pad of Oga *et al.* in the device of Shibata since this shape provides better flowability to the back side of the die [column 10, lines 45-46].

Regarding claim 5, Shibata further teaches a tetragonal resin member where portions of the leads protrude outwardly from the resin on four sides [Figure 4].

Regarding claim 6, Shibata does not discuss resin contacting the rear surface of the chip. Oga *et al.* teaches resin sealing the back of the chip except where it is bonded to the die pad [column 10, lines 45-46]. It would have been obvious to one of ordinary skill in the art to resin seal the back side of the device of Shibata since Oga *et al.* teaches that this prevents the occurrence of a void and penetration of moisture at the corners [column 10, lines 48-52].

3. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shibata and Oga *et al.* as applied to claim 2 above, and further in view of Abbott *et al.*

Shibata as modified by Oga *et al.* teaches a circular die pad, but does not discuss a cross shaped die pad. Abbott *et al.* (US 5,429,992) teaches both a circular and cross shaped die pad [Figures 4A and 4B]. It would have been obvious to one of ordinary skill in the art to use the cross shape of Abbott *et al.* in the device of Shibata since Abbott *et al.* shows that a cross shape is a design alternative for providing manufacturing flexibility [column 3, lines 28-35].

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*Conclusion*

4. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The cited prior art teaches lead frames with variable bond pad pitches.

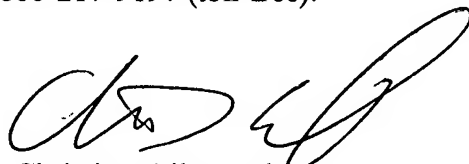
5. A copy of the EAST search history is enclosed.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christian Wilson whose telephone number is (571) 272-1886.

The examiner can normally be reached on weekdays, 7:30 AM to 4 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard Elms can be reached on (571) 272-1869. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Christian Wilson, Ph.D.  
Primary Examiner  
Art Unit 2824

CDW